BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/034,054	12/27/2001	Kevin Allan Dooley	01-777	1701

7590 04/28/2003

Gregory P. LaPointe
BACHMAN & LaPOINTE, P.C.
Suite 1201
900 Chapel Street
New Haven, CT 06510-2802

EXAMINER
LIU, HAN L

ART UNIT	PAPER NUMBER
3746	7

DATE MAILED: 04/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/034,054	DOOLEY, KEVIN ALLAN	
	Examiner	Art Unit	
	Han Lieh Liu	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 December 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7,8,12 and 14-16* is/are rejected.

7)☒ Claim(s) *6,9-11,13 and 17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 April 2002* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5,6* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Receipt is acknowledged of papers submitted for "Drawing" on 04/30/2002. The newly received drawing package contains Figs. 1 – 3, 5A, 5B, 6A, 6B, 7A, 7B and 8 – 10. Fig. 4A and 4B are not included.

Specification

2. The disclosure is objected to because of the following informalities:

Fig. 4A and 4B are listed in Page 4 under the heading "Brief Description of the Drawing" and discussed in Page 10 line 13 and Page 13 line 19. Since Figs. 4A and 4B were originally filed with the application on 12/27/2001, it is not clear if these two Figures should be considered.

In page 7 line 23, "As best illustrated in Figs. 5A and 5B" is recited. Figs. 5A and 5B do not provide all the elements for the discussion. They are shown in Fig. 3. A revised Figs 5A and 5B or revised text, i.e. using Fig. 3, to reflect discussed elements is required.

Legends 42b and 44b are cited for "spacer rings" in page 7 line 27. Same legends are also cited for "retaining rings" in page 8 line 7. It is not clear if a "spacer ring" is a "retaining ring".

In page 8 line 16, "spacer 44a and 44b" is recited. It is not clear if they should be referred to as "spacer 39a and 39b".

In page 7 line 27 and page 8 line 3, "valve housing 40a and 40b" are recited respectively. It is not clear if they are also called "valve seat 40a and 40b" in page 7 line 9.

In page 14 line 2, "actuator 38" is recited. Legend 38 is also assigned to sheath in page 13 line 19. It is suggested to change "actuator 38" to "actuator 32".

In page 14 lines 13 – 14, the operation of valves: '26a being closed' and '26b being opened', do not match with the drawing Fig. 8. Fig 8 shows: 26a is opened and 26b is closed.

In page 15 lines 1 – 2, the recitation of "valve 26a is opened and valve 26b is closed" matches with the referenced Fig. 9. However, the locations of those two valves are switched as compared to the corresponding Fig. 8. A consistent representation of valve locations is required for all related Figures.

Appropriate correction is required.

Drawings

2 The drawings are objected to under 37 CFR 1.83(a) because they fail to show Figs 4A and 4B as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawase (JP 11-93830) and further in view of Thornton et al. (USPN 5129789).

Kawase discloses a pump shown in Fig 1 comprising: an actuator (7) formed of a magnetostrictive material susceptible to changes in physical dimensions in the presence of a magnetic field (paragraph 10 details the extension and contraction of the super-magnetostriction rod 7a to complete the pumping action under the magnetic field generated 7b); first and second (4 and 5) pumping chambers coupled to said magnetostrictive element (7a). Kawase, however, does not provide the details of the magnetostrictive material as how it change shape in the magnetic field. Thornton et al. illustrated in Figs. 3 – 6 as how the diameter of the magnetostrictive element is reduced (from 66 to 68) while the axial length is being increased (from 62 to 64) and Abstract. Therefore, it would have been obvious to one having ordinary skill in the art of working with magnetostrictive material at the time the invention was made to advantageously apply the property of a magnetostrictive material under the influence of the magnetic field to effectively used it to reciprocating the piston as taught by Kawase and illustrated by Thornton et al.

4. Claims 2 – 5, 7 – 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawase (JP 11-93830) in view of Thornton et al. (USPN 5129789) as applied to claim 1 and further in view of Simpson et al. (USPN 5203172).

Kawase, in view of Thornton et al., discloses the invention substantially as claimed in base claim 1. Kawase, in view of Thornton et al., however, teach using only one end of the magnetostrictive rod to drive the pump in the lengthwise extent. Simpson et al. teach a hydraulic

engine apparatus having pumping action made possible by a reciprocating piston in a cylinder where the compression chambers are on either side of the piston, Fig. 2, for a balanced operation of the piston; and when one chamber has a maximum volume as the other has a minimum volume. Therefore, it would have been obvious to one having ordinary skill in the art of working with electrical energy for generating magnetic field at the time the invention was made to advantageously have two working chambers on either side of the piston for an effectively balanced operation of the pump, i.e. reducing the pulsation of the discharge, therefore being less noisy, and to double the output volume with a single stroke of the piston.

5. Claims 12 and 14 – 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawase (JP 11-93830) in view of Thornton et al. (USPN 5129789) and Simpson et al. (USPN 5203172) as applied to base claim 7 and further in view of Basilewsky (USPN 2690128).

With regard to claim 12, Kawase, in view of Thornton et al. and Simpson et al., discloses the invention substantially as claimed in base claim 7. Kawase, in view of Thornton et al. and Simpson et al., however, does not specifically teach a plurality of pumps arrangement. Basilewsky illustrated in Fig. 2 a five-pump parallel arrangement. Therefore, it would have been obvious to one having ordinary skill in the art of the design to increase the pumping output at the time the invention was made to advantageously connect identical pumps in parallel, as taught by Basilewsky, to effectively increase the output volume. With identical pumping units, the maintenance of the system becomes simple and less costly.

With regard to claims 14 and 15, Kawase, in view of Thornton et al. and Simpson et al., discloses the invention substantially as claimed in base claim 7. Basilewsky illustrates the

parallel arrangement of five pumps. The number of pumping units required and how units being connected, e.g. in series are both considered as design requirements. More units are required if design requires a larger output volume. If higher discharge pressure is required, a multi-stage pumping unit can be connected. Simple statements of the pump number and their connection without supporting structural elements do not carry patent weight for consideration.

Allowable Subject Matter

6. Claims 6, 9 – 11, 13 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Brenan et al. (USPN 6059546), Kobayashi (JP 6-101631), Engdahl et al. (USPN 4927334), Massie (USPN 3754154).

Brenan et al. disclose a pump for impelling a fluid including a first variable volume with a first inlet for allowing the influx of the fluid into the first variable volume and a first outlet for allowing the efflux of the fluid out of the first volume and a first membrane defining at least a portion of the first volume. The pump also includes a first contractile actuator, for displacing the first membrane from a first position to a second position in such a manner as to vary the first variable volume and a second contractile actuator, for restoring the first membrane from the second position to the first position.

Kobayashi discloses an ultra-magnetostrictive liquid pump utilizing the volume change of an ultra-magnetostrictive rod. A pump chamber is formed in a pump case via an operating piston, a suction valve and a discharge valve are provided in front of the pump chamber, and a liquid pressure chamber is formed between the rod section of the operating piston and a ultra-magnetostrictive actuator in a casing main body. When the volume of an ultra-magnetostrictive rod is changed to change the pressure in the liquid pressure chamber, the operating piston is reciprocated, and the pump chamber is expanded or shrunk.

Engdahl et al. disclose a liquid pump driven by elements of a giant magnetostrictive material. By utilizing the giant magnetostrictive in two alternately operating rods, which are arranged in pairs and are surrounded by coils supplied with current, the first rod imparting a movement when magnetic energy is transformed into mechanical energy in the form of a deformation and the second rod dynamically pre-stressing the first rod together with a load, a piston in a cylinder space of a pump housing may be caused to oscillate for transporting liquid.

Massie discloses a completely sealed magnetically driven pump having a piston armature driven by electrical windings. Unique elect5ical driving circuits are provided for the pump embodying feedback windings magnetically coupled with the driving windings of the pump for controlling the reciprocation.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Han Lieh Liu whose telephone number is 703-305-0860. The examiner can normally be reached on 7:30 to 16:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy S. Thorpe can be reached on 703-308-0102. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9302 for regular communications and 703-872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0861.

Han Lieh Liu
April 22, 2003

CHARLES G. FREAY
PRIMARY EXAMINER